

# REMARKS

Reconsideration is respectfully requested. Claims 1-6 are present in the application. Claim 3 is amended herein. Claims 1, 2 and 4-6 are withdrawn as a result of restriction requirement.

Claim 3 is rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Swift (US 4953366). Applicants respectfully traverse.

Claim 3 is rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Swift (US 4953366) in view of Matsubara (Cryocoolers). Applicants respectfully traverse.

Claim 3 is rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Swift (US 4953366) in view of Corey (US6578364) and further in view of Corey (US2002/0178736) or Moringo et al (US5354185) or Wu (US5412951). Applicants respectfully traverse.

Applicants respectfully cannot agree with the Examiner. Anyone can construct only the thermoacoustic engine (vibration generator) shown in the Figure 6 in the document of Cryocoolers12 by combination of the prior arts, that engine is a thermoacoustic engine of traveling acoustic wave generator with symmetrical resonators and a feedback loop. Applicant's claims are different from the conventional system in the points that applicants claims have symmetrical resonators and a

thermoacoustic engine connected in series for generating traveling acoustic waves. The claims are not obvious from the known thermoacoustic engines, and accordingly should be patented. The claims should be amended to represent the structure of Fig.5 of the specification.

#### **Differences From The Prior Art**

Applicants claim symmetrical resonators and a thermoacoustic engine connected in series for generating traveling acoustic waves to drive a pulse-tube refrigerator. That structure is different from the prior art and non-obvious. The symmetrical resonators are known in public, but, it is not known that the traveling acoustic waves are generated using symmetrical resonators and a thermoacoustic engine connected in series without feedback-loop. And also the thermoacoustic engine without a feedback-loop to show the energy-flow pattern as shown in the Figure 9(c) of the drawings of this application. Particularly, it is not known in public that a thermoacoustic engine with symmetrical resonators connected to the inlet of the engine generates traveling acoustic waves.

#### **Advantages Of Applicants' Claimed Device**

Advantages over the art are provided by applicants' claimed devices. These advantages included:

- The symmetrical resonators reduce the vibration.
- The refrigerator system can be made small as the feedback-loop is omitted.

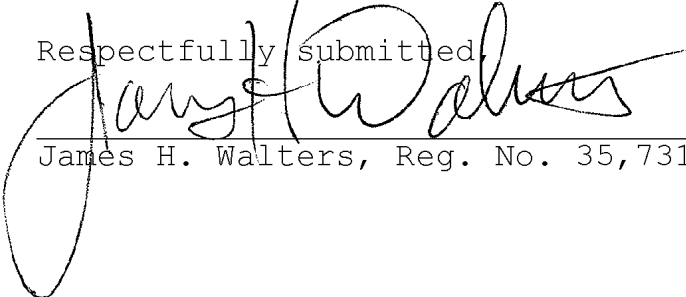
- The traveling acoustic waves are generated and then they raise the efficiency of the refrigerator.

Overall, the generation of the traveling acoustic waves by serial connection of symmetrical resonators and a thermoacoustic engine results in a high-efficient small pulse-tube refrigerator with low-vibration.

In light of the above noted amendments and remarks, this application is believed in condition for allowance and notice thereof is respectfully solicited. The Examiner is asked to contact applicant's attorney at 503-224-0115 if there are any questions.

It is believed that no further fees are due with this filing or that the required fees are being submitted herewith. However, if additional fees are required to keep the application pending, please charge deposit account 503036. If fee refund is owed, please refund to deposit account 503036.

Respectfully submitted

  
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